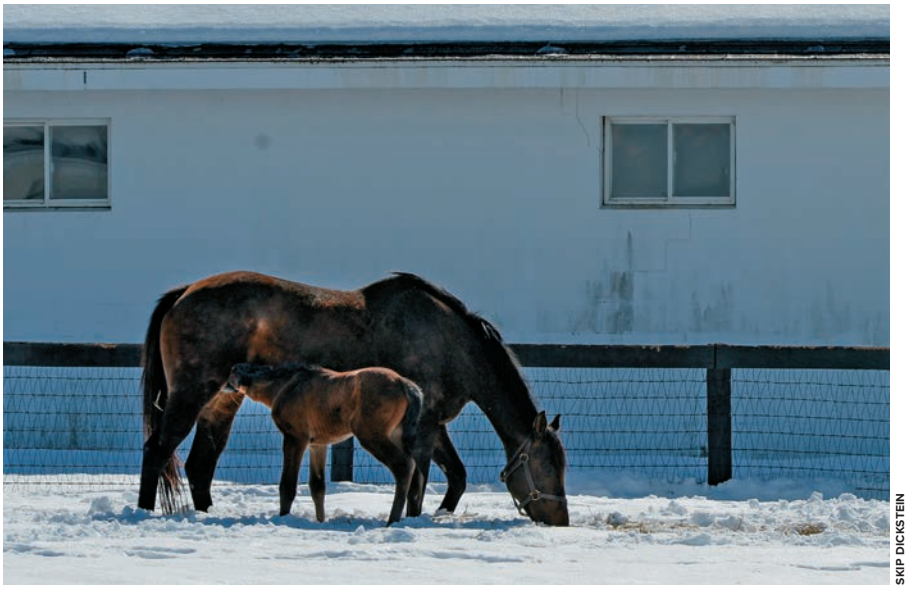

SKIP DICKSTEIN

Good broodmare management is the best aid for helping the mare

BY AMANDA DUCKWORTH

FOR A THOROUGHBRED MARE the ability to become pregnant reliably and deliver a foal safely is key to being a productive member of a broodmare band. Multiple years of being barren are a concerning negative, even for the best-bred or most highly accomplished mares. The most constructive and beneficial ways to help broodmares achieve these goals remain a constantly studied and reviewed process in the veterinary field.

As the American Association of Equine Practitioners explains in its paper "Expectant Mare: Assuring the Health and Well-Being of the Pregnant Mare," proper mare management throughout the process is crucial to increasing the chances of a successful foaling.

"We often think of pregnancy as a delicate and fragile condition," the paper explains. "When it comes to horses, this perception is perhaps due to the mare's relatively poor reproductive performance in comparison to other domestic animals. However, in a natural setting, the mare does comparatively well reproductively. Therefore, this seemingly poor performance is due as much to improper management as to any reproductive deficiency. Fortunately, management is something we can control.

Proper management required to maintain successful broodmare performance

"Proper nutrition, deworming, exercise, and vaccinations will help ensure a healthy pregnancy. Good broodmare management is the best aid for helping the mare make it through the critical first 30-60 days of pregnancy."

Understanding how and why pregnancies can go wrong has proved invaluable in improving management practices throughout the decades. While there will always be some level of uncontrollable risk that comes down to luck and Mother Nature, managing a herd of broodmares properly is important for both their well-being and the economic realities of such an endeavor.

To that end, researchers published "A deterministic simulation model for the evaluation of reproductive performance in Thoroughbred mares" in the February 2021 edition of *Theriogenology*.

"As an application, the model was used to estimate the herd level asymptotic foaling percentage (AFP) for evaluating the performance of mares in stabilized mare herds using the convergent method for estimating a steady-state distribution of mares," explains the study. "In this model, it was assumed that the mares were mated only during the breeding season. The effects of early pregnancy loss and fetal loss on reproductive performance were investigated.

"The sensitivities of AFP to changes in conception rate (CR), early pregnancy loss rate (EPLR), fetal loss rate (FLR), and postpartum mating interval (PMI) were examined. Furthermore, the AFPs were compared for two types of postpartum first mating schedules: mating during the first postpartum estrous cycle (foal heat) and first mating during the subsequent cycle."

According to the study, foal-heat matings resulted in higher AFP than waiting to breed the mare later and shortening of an estrous cycle by PGF2α (Prostaglandin F2alpha) improved AFP after subsequent estrous mating.

"The results indicated that AFP was sensitive to changes in EPLR, FLR, and CR," the study found. "The comparison of the two types of postpartum first mating schedules showed that AFP after foal-heat mating was higher than after the subsequent estrous mating even with the decrease in reproductive parameters caused by foal-heat mating in the model."

Breeding on the foal heat has been a long debated and explored option in broodmare management, as has the

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success rate of breeding older mares, but they are far from the only reason mares can fail to get in foal or maintain a pregnancy. The January 2019 issue of *Theriogenology* includes the study "Multivariable analysis to determine risk factors

ANNE M. EBERHARDT

There is always some level of uncontrollable risk that comes down to luck and Mother Nature

associated with early pregnancy loss in Thoroughbred broodmares."

For the study, information relating to 28 factors including mare, stallion, pregnancy, and therapeutic interventions was collected over the 2013-14 breeding seasons in the United Kingdom.

"Early pregnancy loss (EPL) between days 15-65 after breeding has been shown to occur in 7.9% of equine pregnancies with substantial economical, welfare, and safety implications," explains the study. "While maternal age has been recognized as an important risk factor in relation to the incidence of EPL, few other risk factors have been conclusively identified. Further, multivariable data analysis of risk factors for EPL is sparse.

"Mixed effects logistic regression was used to determine risk factors for EPL, including 'mare' as a random effect to account for repeat pregnancies in the same mare. Stallion, stud, and veterinarian were also evaluated as random effects."

Overall, the study collected data on 2,245 pregnancies in 1,753 mares. Following multivariable analysis, it was found that increasing mare age, having had one previous foal, and the presence of uterine cysts were all associated with increased odds of early pregnancy loss. Furthermore, early pregnancy loss was negatively associated with increasing day 15/16 scan vesicle size and the use of ovulatory induction agents while stallion, stud, and veterinarian were not significantly associated.

Additionally, there was a subpopulation of 344 multiple pregnancies featuring twins or triplets within the study. Analysis found that the use of flunixin meglumine at the time of manual reduction of a multiple pregnancy resulted in reduced odds of early pregnancy loss.

"Results from this study can be used by stud farm personnel when assessing their broodmare population and by clinicians when deciding upon therapeutic strategies," the study concluded. "Additional work can be focused around these risk factors to further our understanding of the pathophysiology of EPL."

Because broodmares in commercial settings tend to receive a high amount of daily care, there is also the question of which management approaches seem the most productive when it comes to safeguarding pregnancies and foalings, especially in regard to therapeutic practices.

This part of the equation was examined by researchers in "Descriptive study of current therapeutic practices, clinical reproductive findings, and incidence of pregnancy loss in intensively managed Thoroughbred mares," which was published in the January 2018 issue of *Animal Reproduction Science*.

"Therapeutic practices in equine reproductive medicine have dramatically evolved over the last 20 years, but current usage is not described," the study explains. "The aims of this study were to provide a description of medication use and clinical findings of reproductive examinations alongside measures of reproductive efficiency in Thoroughbreds."

The study used information collected from 2,246 pregnancies in 1,754 mares from 29 stud farms. It found that ovulatory induction agents were used in 91.8% of cases, estrous induction agents in 38.4% of cases, and covering therapies in 62.7% cases. Intrauterine antimicrobials were used in 49.6% of mares. Single pregnancies accounted for 83.9% of pregnancies, twins for 15.3%, and triplets for 0.7%. In total, 83% of all pregnancies resulted in a live foal. Of the pregnancies that were lost, 6.4% occurred between days 15-42, 1.6% between days 43-65, 1.3% were lost by October, and 4.5% by birth (including stillbirths).

"There has been a considerable increase in the use of reproductive therapeutics over the last 12 years," the study concluded. "Nonetheless, incidence of pregnancy loss and live foal percentages remain essentially unchanged. Risk factor studies are required to determine if the substantial increase in therapeutic usage is conferring positive benefits."

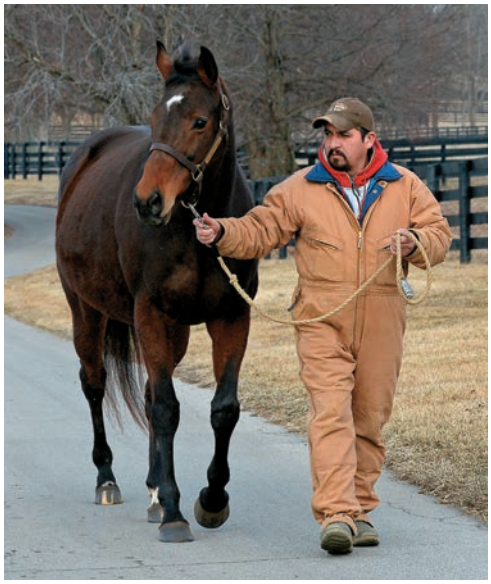
In addition to early pregnancy loss, another important area of study examines what causes broodmares who are believed to be safely in foal to later lose the pregnancy. The study "Incidence and causes of pregnancy loss after Day 70 of gestation in Thoroughbreds," appears in the November 2020 issue of *Equine Veterinary Journal*.

"Pregnancy loss after Day 70 of ges-

tation manifests as abortion, stillbirth or perinatal death," explains the study. "While previous studies have reported the diagnoses of laboratory submissions, none have quantified the incidence and causes of abortions, stillbirths, and perinatal mortality at a population level."

For the study, outcomes were collected from eight Thoroughbred farms over the 2013-17 breeding seasons, and stud, veterinary, and laboratory records were supplemented with publicly available data. The cause of loss was categorized using custom criteria, and the main limitation of the study was the inability to differentiate between intrapartum stillbirth and early postpartum death.

In total, data on 3,586 pregnancies from 1,802 mares were collected. The incidence risk of a pregnancy failing to produce a live foal at 24 hours postparturition was 7.3%, while the incidence of pregnancy loss between Day 70-300 of gestation, Day 301-315, and stillbirth/perinatal death was 4.0%, 0.3%, and 1.4%, respectively.



ANNE M. EBERHARDT

Broodmares in commercial settings tend to receive a high amount of daily care

"Of the pregnancy losses where tissue was available, 61.1% were submitted for postmortem examination. The incidence risk of loss due to umbilical cord-related pathologies was 1.5%, 0.4% for noninfectious placental disease, and 0.3% for both infectious placentitis and equine herpesvirus infection," the study concluded. "No primary diagnosis was made in 11.2% of the cases that underwent full postmortem examination.

"Pregnancy loss after Day 70 of gestation is a significant source of loss in the Thoroughbred with umbilical cord-related pathologies being the most commonly diagnosed cause. Reporting the incidence of pregnancy loss at a population level with clear case definitions will allow for accurate global comparisons."

Of course, the dedication of veterinarians and those taking care of broodmares on a daily basis does mean that a mare's chance of a successful pregnancy has increased greatly over the course of the

LYDIA A. WILLIAMS

The vast majority of Northern Hemisphere broodmares will go on to produce healthy foals come 2022

last five decades for a number of reasons. While striving to do even better, it is important to appreciate how far methods have come.

"Half a century of equine reproduction research and application: A veterinary tour de force," which appears in the January 2018 issue of *Equine Veterinary Journal*, reviews the success.

A sampling of the significant pharmacological treatments and diagnostic methods within the review include the application of artificial lighting to hasten the onset of ovulatory estrous cyclicity in early spring; rapid steroid hormone assays to aid in determining the stage and normality of the mare's cycle; prostaglandin analogues, synthetic progestagens, and gonadotrophin-releasing Hormone (GnRH) analogues that better control and manipulate her cycle to good effect; transrectal ultrasound scanning to monitor follicle growth, endometrial architecture and ovulation to allow accurate, early pregnancy diagnosis, thereby enabling successful ablation of one of twin conceptuses; flexible videoendoscopy to monitor physiological and pathological changes in the uterine endometrium; and rigid laparoscopy to apply prostaglandin to the oviducts to dislodge and clear suspected blockages of them to restore fertility.

"Over the past 50 years, per-season pregnancy rates in Thoroughbred mares have risen from 70 to >90% and foaling rates from 55 to >80%," the paper explains. "The past half-century has witnessed many technical and therapeutic advances that have enhanced tremendously the diagnostic and treatment capabilities of stud farm veterinary surgeons. They, in turn, have improved greatly the efficiency of breeding Thoroughbreds and other types of horses."

As the new breeding and foaling season gets underway for Northern Hemisphere broodmares, it is no small feat that the vast majority of them will go on to produce healthy foals come 2022. Knowing a mare's history when it comes to foaling can provide crucial insight, and the relationship between veterinarians and caregivers is invaluable to broodmares as they work to remain productive members of the broodmare band. BH

Amanda Duckworth is a freelance writer based in Lexington.